

Appl. No. 09/253,638
Amtd. dated April 28, 2003
Reply to Office Action of October 30, 2002
Attorney Docket No. 1217-990257

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended): A process for producing a polymeric actuator comprising an ion-exchange resin product and metal electrodes which are formed on the surface of the ion-exchange resin product and are insulated from each other, said actuator operating as an actuator by applying a potential difference between the metal electrodes when the ion-exchange resin product is in the water-containing state to allow the ion-exchange resin product to undergo bending or deformation,

wherein the following steps (i) to (iii) are repeatedly conducted to form the metal electrodes ranging from the surface of the ion-exchange resin product to the inside thereof;

(i) a step of allowing the ion-exchange resin product to adsorb a metal complex in an aqueous solution (adsorption step),

(ii) a step of reducing the metal complex adsorbed on the ion-exchange resin product by a reducing agent to deposit a metal on the surface of the ion-exchange resin product (deposition step), and

(iii) a step of washing the ion-exchange resin product having the deposited metal (washing step),

such that the deposition of the metal is conducted ~~not only~~ on the surface of the ion-exchange resin product ~~but also in the interior near the surface and further in the resin product.~~

Claims 2-7 (canceled)

8. (previously added): A process as in claim 1, wherein the adsorption, deposition, and washing steps are repeatedly conducted for at least 4 cycles.

9. (previously added): A process as in claim 8, wherein the adsorption, deposition, and washing steps are repeatedly conducted for a number of cycles in the range of from 4-9.

10. (new): A process as in claim 1, wherein in the case of an ion-exchange resin product being a plate or a film, the ratio of the thickness (a1) of the metal electrode formed on the ion-exchange resin product to the thickness (b1) of the ion-exchange resin product including the metal electrode (a1/b1) is in the range of 0.03 to 0.40.

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11. (new): A process as in claim 1, wherein in the case of the ion-exchange resin product being a cylinder with the metal electrode formed on an outer or inner surface thereof, the ratio of the thickness (a2) of the metal electrode formed on the ion-exchange resin product to the thickness (b2) of the cylindrical ion-exchange resin product including the metal electrode (a2/b2) is in the range of 0.02 to 0.70.

12. (new): A process as in claim 1, wherein in the case of the ion-exchange resin product being a cylinder with the metal electrode formed on both an inner and outer surface thereof, the ratio of the thickness (C) of the cylindrical ion-exchange resin product excluding the metal electrode to the thickness (b4) of the cylindrical ion-exchange resin product including the metal electrode (C/b4) is in the range of 0.20 to 0.95.

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CLEAN VERSION OF AMENDED CLAIM 1

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1. (currently amended): A process for producing a polymeric actuator comprising an ion-exchange resin product and metal electrodes which are formed on the surface of the ion-exchange resin product and are insulated from each other, said actuator operating as an actuator by applying a potential difference between the metal electrodes when the ion-exchange resin product is in the water-containing state to allow the ion-exchange resin product to undergo bending or deformation,

wherein the following steps (i) to (iii) are repeatedly conducted to form the metal electrodes ranging from the surface of the ion-exchange resin product to the inside thereof;

(i) a step of allowing the ion-exchange resin product to adsorb a metal complex in an aqueous solution (adsorption step),

(ii) a step of reducing the metal complex adsorbed on the ion-exchange resin product by a reducing agent to deposit a metal on the surface of the ion-exchange resin product (deposition step), and

(iii) a step of washing the ion-exchange resin product having the deposited metal (washing step),

such that the deposition of the metal is conducted on the surface of the ion-exchange resin product and further in the resin product.